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(54) **AEROSOL DELIVERY DEVICE**

(57) Disclosed is an aerosol delivery device comprising a mouthpiece comprising an end surface at a longitudinal end of the mouthpiece, and a mouthpiece aperture formed in the end surface, an aerosolisation chamber extending longitudinally into the device from the mouthpiece aperture, a transverse cross-sectional area of the aerosolisation chamber being uniform along a longitudinal length of the aerosolisation chamber, a storage chamber for storing an aerosol precursor, and a porous liquid transfer element comprising an aerosol generating portion at least partly received in the aerosolisation chamber and a conveying portion for conveying liquid from the storage chamber to the aerosol generating portion.

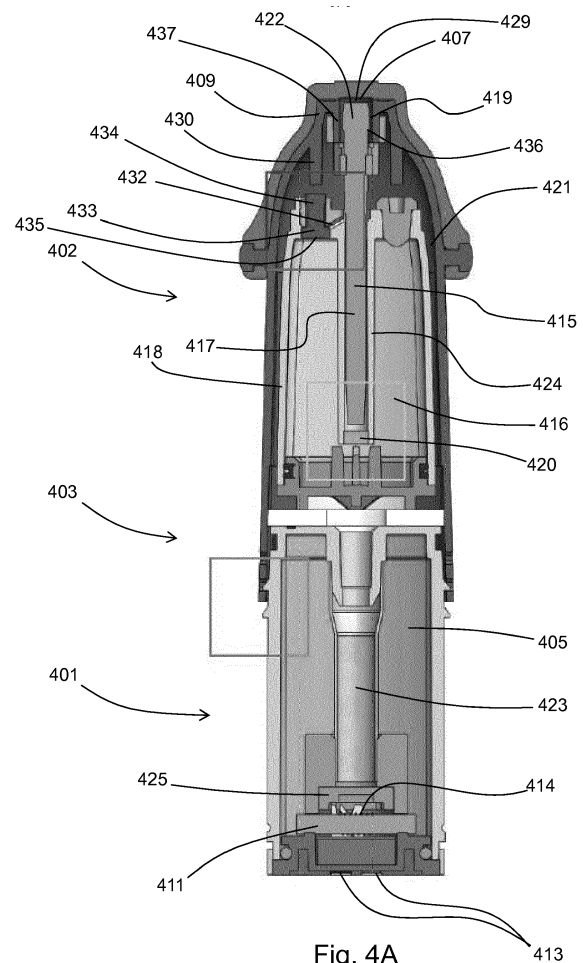


Fig. 4A

Description

Field of the Invention

[0001] The present invention relates to an aerosol delivery device and system, and particularly, although not exclusively, to an aerosol delivery device/system including an aerosol generator in the form of a porous element.

Background

[0002] One form of an aerosol delivery device is a smoking-substitute system, which is an electronic system that permits the user to simulate the act of smoking by producing an aerosol or vapour that is drawn into the lungs through the mouth and then exhaled. The inhaled aerosol or vapour typically bears nicotine and/or other flavourings without the odour and health risks associated with traditional smoking and tobacco products. In use, the user experiences a similar satisfaction and physical sensation to those experienced from a traditional smoking or tobacco product, and exhales an aerosol or vapour of similar appearance to the smoke exhaled when using such traditional smoking or tobacco products.

[0003] One approach for a smoking substitute system is the so-called "vaping" approach, in which a vaporisable liquid, typically referred to (and referred to herein) as "e-liquid", is heated by a heating element to produce an aerosol/vapour which is inhaled by a user. The e-liquid typically includes a base liquid as well as nicotine and/or flavourings. The resulting vapour therefore also typically contains nicotine and/or flavourings. The base liquid may include propylene glycol and/or vegetable glycerine.

[0004] A typical vaping smoking substitute system includes a mouthpiece, a power source (typically a battery), a tank for containing e-liquid, as well as a heating element. In use, electrical energy is supplied from the power source to the heating element, which heats the e-liquid to produce an aerosol (or "vapour") which is inhaled by a user through the mouthpiece.

[0005] Vaping smoking substitute systems can be configured in a variety of ways. For example, there are "closed system" vaping smoking substitute systems, which typically have a sealed tank and heating element. The tank is pre-filled with e-liquid and is not intended to be refilled by an end user. One subset of closed system vaping smoking substitute systems include a base unit which includes the power source, wherein the base unit is configured to be physically and electrically coupled to a consumable including the tank and the heating element. The consumable may also be referred to as a cartomizer. In this way, when the tank of a consumable has been emptied, the consumable is disposed of. The base unit can be reused by connecting it to a new, replacement, consumable. Another subset of closed system vaping smoking substitute systems are completely disposable, and intended for one-use only.

[0006] There are also "open system" vaping smoking

substitute systems which typically have a tank that is configured to be refilled by a user. In this way the system can be used multiple times.

[0007] An example vaping smoking substitute system is the myblu® e-cigarette. The myblu® e-cigarette is a closed system which includes a base unit and a consumable. The base unit and consumable are physically and electrically coupled together by pushing the consumable into the base unit. The base unit includes a rechargeable battery. The consumable includes a mouthpiece, a sealed tank which contains e-liquid, as well as a heating element, which for this system is a heating filament coiled around a portion of a wick. The wick is partially immersed in the e-liquid, and conveys e-liquid from the tank to the heating filament. The device is activated when a micro-processor on board the base unit detects a user inhaling through the mouthpiece. When the system is activated, electrical energy is supplied from the power source to the heating element, which heats e-liquid from the tank to produce a vapour which is inhaled by a user through the mouthpiece.

[0008] For a smoking substitute device it is desirable to deliver nicotine into the user's lungs, where it can be absorbed into the bloodstream. As explained above, in the vaping approach, e-liquid is heated by a heating element to produce an aerosol/vapour which is inhaled by a user. Many e-cigarettes also deliver flavour to the user, to enhance the experience. Flavour compounds are contained in the e-liquid that is heated. Heating of the flavour compounds may be undesirable as the flavour compounds are inhaled into the user's lungs. Toxicology restrictions are placed on the amount of flavour that can be contained in the e-liquid. This can result in some e-liquid flavours delivering a weak and underwhelming taste sensation to consumers in the pursuit of safety.

[0009] In some smoking substitute devices/systems, liquid used to form an aerosol can leak from the device and/or can collect in or on parts of the device. When such liquid collects in parts of the device that are within an airflow path of the device, such liquid can be entrained in an airflow in the airflow path. T

[0010] The present invention has been devised in light of the above considerations.

Summary of the Invention

[0011] At its most general, the present invention relates to an aerosol delivery device comprising an aerosolisation chamber having a uniform/constant cross-sectional area along its length, and a porous liquid transfer element at least partly received in the aerosolisation chamber.

[0012] According to a first aspect there is provided an aerosol delivery device comprising:

a mouthpiece comprising an end surface at a longitudinal end of the mouthpiece, and a mouthpiece aperture formed in the end surface;

an aerosolisation chamber extending longitudinally into the device from the mouthpiece aperture;

a storage chamber for storing an aerosol precursor; and

a porous liquid transfer element comprising an aerosol generating portion at least partly received in the aerosolisation chamber and a conveying portion for conveying liquid from the storage chamber to the aerosol generating portion,

wherein a transverse cross-sectional area of the aerosolisation chamber is uniform along a longitudinal length of the aerosolisation chamber

[0013] The provision of an aerosolisation chamber having a uniform cross-sectional area, as opposed to e.g. a conical chamber, may reduce or avoid the build-up of aerosol precursor at the mouthpiece aperture. For example, a conical chamber can diverge from the aerosol generating portion of the liquid transfer element, which may result in a space between the wall(s) defining the chamber and the liquid transfer element that is larger than would otherwise be the case of a non-diverging (i.e. uniform cross-section) chamber. This larger space may allow for a greater build-up of aerosol precursory, so as to result in a larger propensity for leakage from the device and may also result in a greater propensity for large droplets of aerosol precursor to be entrained in airflow from the device. Thus, the provision of a uniform cross-section chamber may result in a more consistent droplet size in the aerosol delivered by the device.

[0014] Similarly, when the space between the chamber walls and the aerosol generating portion is minimised, the surface tension of any aerosol precursor between the chamber walls and the aerosol generating portion may be more likely to be sufficient to retain the aerosol precursor in the device.

[0015] As the aerosolisation chamber extends from the mouthpiece aperture, it may otherwise be considered an outlet (e.g. a mouthpiece outlet) of the device.

[0016] Optional features will now be set out. These are applicable singly or in any combination with any aspect.

[0017] The aerosol generating portion of the liquid transfer element may have a larger transverse cross-sectional area (taken at a location adjacent the conveying portion) than a transverse cross-sectional area (taken at a location adjacent the aerosol generating portion) of the conveying portion. In this respect, the aerosol generating portion may define an enlarged portion of the aerosol generator. The aerosol generating portion may have a circular transverse cross-sectional shape. The conveying portion may have a circular transverse cross-sectional shape. In this respect, the aerosol generating portion may have a larger radius than the conveying portion.

[0018] Due to the aerosol generating portion being larger than the conveying portion, a transversely (e.g.

radially) extending transition surface may be defined between the conveying portion and the aerosol generating portion. The transition surface may define an outward step from the conveying portion to the aerosol generating portion. The transition surface may have a concave profile. Hence, the transition surface may form a smooth continuous transition with an outer circumferential surface of the conveying portion. On the other hand, there may be a (substantially) sharp transition between the transition surface and an outer circumferential surface of the aerosol generating portion. In this respect a leading edge of the aerosol generating portion may be defined between the transition surface and the outer circumferential surface of the aerosol generating portion.

[0019] The aerosolisation chamber may have a cylindrical shape. For example, the aerosolisation chamber may have a circular cylinder shape (i.e. having a circular transverse cross-section) or an elliptical cylinder shape (having an elliptical transverse cross-section). A transverse cross-sectional shape of the aerosol generating portion may correspond to a transverse cross-sectional shape of the aerosolisation chamber (i.e. they may both be circular or elliptical). In this way, the aerosol generating portion and a wall defining the aerosolisation chamber may be concentrically arranged.

[0020] The longitudinal length of the aerosolisation chamber may be between 6 mm and 3 mm, for example between 5 mm and 4 mm, e.g. about 4.5 mm.

[0021] The aerosol generating portion may be fully received in the aerosolisation chamber. A portion of the conveying portion (i.e. a portion adjacent the aerosol generating portion) may be received in the aerosolisation chamber. Alternatively, only a portion of the aerosol generating portion (or liquid transfer element) may be received in the aerosolisation chamber (i.e. at an upstream end of the aerosolisation chamber). Thus a portion of the aerosolisation chamber (e.g. at or adjacent to the mouthpiece aperture and downstream of the aerosol generating portion) may not include the aerosol generating portion.

[0022] An airflow path may be defined between a wall defining the aerosolisation chamber and the liquid transfer element. Where the aerosolisation chamber is cylindrical, the airflow path may be annular. The airflow path may have a constricted region defined by the aerosol generating portion. The transverse/radial distance between the aerosol generating portion and the wall of the aerosolisation chamber at the constricted region may be less than 0.5 mm, for example less than 0.4 mm, or e.g. less than 0.3 mm.

[0023] The constricted region may define the narrowest part of the airflow path through the aerosolisation chamber. This constriction of the airflow passage increases the velocity of air/vapour passing through the aerosolisation chamber. In this respect, the constriction may be referred to as a Venturi aperture. The constriction may have a toroidal shape (i.e. extending about the aerosol generating portion of the liquid transfer element). The toroidal shape may, however, be interrupted by sup-

ports (e.g. projections, ribs, etc.) protruding inwardly from wall(s) of the aerosolisation chamber to support the aerosol generating portion in the aerosolisation chamber.

[0024] In addition to increasing the airflow velocity, the constriction reduces the air pressure of the airflow flowing through the constriction (i.e. in the vicinity of the aerosol generating portion). This low pressure and high velocity facilitate the generation of an aerosol from the aerosol precursor held in the aerosol generating portion (i.e. conveyed from the storage chamber by the liquid transfer element). This aerosol is entrained in the airflow passing through the constriction and is discharged from the mouthpiece aperture of the aerosol delivery device.

[0025] The airflow path may have an expansion region downstream of the constricted region, in which a cross-sectional area of the airflow path (e.g. gradually) increases in the downstream direction. The expansion region may be defined by a tapered section of the aerosol generating portion. The tapered section may taper inwardly in a direction from the constricted region to a downstream (distal) end of the aerosol generating portion. The taper may have a curved profile (i.e. in the longitudinal direction).

[0026] The terms "upstream" and "downstream" are used herein with reference to the direction of airflow through the device during normal use of the device (i.e. by way of inhalation at the mouthpiece aperture).

[0027] The transverse/radial distance between the aerosol generating portion and the wall of the aerosolisation chamber at the distal/downstream end of the aerosol generating portion may be less than 1 mm, for example less than 0.7 mm, or e.g. less than 0.5 mm. The transverse/radial distance between the aerosol generating portion and the wall of the aerosolisation chamber at the distal/downstream end of the aerosol generating portion may be less than 20% of the diameter of aerosolisation chamber, for example less than 17%, or e.g. less than 15%.

[0028] A distal (transversely extending) end surface of the aerosol generating portion (i.e. at the extreme downstream end of the aerosol generating portion) may be being substantially planar. In other words, the aerosol generating portion (and thus the liquid transfer element) may have a flattened or truncated distal end. The combination of the planar/flattened distal end and the aerosolisation chamber of constant cross-sectional area may provide a more evenly dispersed spray from the device. For example, such an arrangement may result in a smaller gap between the aerosolisation chamber walls and the aerosol generating portion (e.g. compared with an arrangement having a conical outlet and/or a conical aerosol generating portion), which may reduce the presence of large droplets of liquid in the aerosol discharged from the device.

[0029] The distal end of the aerosol generating portion may be spaced from the mouthpiece aperture/end surface (e.g. transversely extending end surface of the mouthpiece) in an upstream longitudinal direction. That

is, the distal (downstream) end of the aerosol generating portion/liquid transfer element may be recessed with respect to the end surface of the mouthpiece. For example, the distal end may be spaced (in the longitudinal direction) from the end surface of the mouthpiece or mouthpiece aperture by less than 1.5 mm, or less than 1 mm, or e.g. less than 0.5 mm.

[0030] The aerosolisation chamber may be defined by a tube extending upstream and longitudinally from the end surface of the mouthpiece. The device may comprise a retaining element for retaining the liquid transfer element in position with respect to the mouthpiece. The retaining element may comprise a mounting portion extending about the tube so as to mount the retaining element to the tube. The retaining element may comprise a collar projecting from the mounting portion and at least partly circumscribing the liquid transfer element (e.g. the conveying portion) so as to retain the liquid transfer element against movement relative to the mouthpiece. The liquid transfer element (e.g. the conveying portion) may comprise one or more recesses for receipt of a portion of the collar so as to facilitate retaining of the liquid transfer element by the collar.

[0031] The aerosol delivery device may comprise a flow passage for fluid flow therethrough. The flow passage may extend generally in the longitudinal direction between (and may fluidly connect) an inlet of the aerosol delivery device and the aerosolisation chamber. In this respect, a user may draw fluid (e.g. air) into and through the flow passage and aerosolisation chamber of the aerosol delivery device by inhaling at the mouthpiece aperture.

[0032] The flow passage may comprise one or more deflections. It may comprise a transverse portion proximal the inlet such that there is a deflection between inlet and the transverse portion of the flow passage.

[0033] The flow passage may then comprise a generally longitudinal portion downstream of the transverse portion. The longitudinal portion may extend within a spacing between a device housing (which may be integral with the mouthpiece) and a tank (discussed further below) defining the storage chamber. The flow passage may then deflect again (e.g. radially) at the upper surface of the tank within the mouthpiece, through the aerosolisation chamber, towards the mouthpiece aperture.

[0034] The flow passage may be a single (annular) flow passage around the tank or it may comprise two branches which split around the tank and re-join within the mouthpiece e.g. proximal the liquid transfer element.

[0035] As is mentioned above, the aerosol delivery device may comprise a tank defining the storage chamber for containing the aerosol precursor (which may be e.g. an e-liquid or a flavour liquid). The aerosol precursor may, for example, comprise a flavourant having a menthol, liquorice, chocolate, fruit flavour (including e.g. citrus, cherry etc.), vanilla, spice (e.g. ginger, cinnamon) and/or tobacco flavour.

[0036] The aerosol precursor may be stored in the form

of a free liquid. Alternatively, a porous body may be disposed within the storage chamber, which may contain the aerosol precursor.

[0037] The tank may at least partially define the flow passage. For example, the flow passage may be defined between an outer surface of the tank and an inner surface of a device housing (which may be integral with the mouthpiece)

[0038] The aerosol delivery device may comprise an air bleed channel configured to allow the bleeding of air into the storage chamber to replace aerosol precursor that is removed from the storage chamber. The air bleed channel may be in fluid communication with the flow passage, such that (e.g. under certain conditions) air from the flow passage can enter the storage chamber through the air bleed channel.

[0039] As will be described further below, the liquid transfer element (i.e. the aerosol generating portion) is configured to generate an aerosol in the aerosolisation chamber. The liquid transfer element may do this in such a way that does not use heat to form the aerosol, and therefore in some embodiments may be referred to as a "passive" aerosol generator.

[0040] The conveying portion may be elongate and generally cylindrical, and may be at least partially enclosed within one or more internal walls of the aerosol delivery device. The one or more internal walls enclosing the conveying portion may form part of the tank defining the storage chamber. In this respect, the tank may at least partly surround (e.g. may fully surround) the conveying portion. That is, the tank may define a conduit through which the conveying portion passes. Thus, the conveying portion may extend generally longitudinally (e.g. centrally) through a portion of the tank (i.e. through the conduit defined by the tank).

[0041] The liquid transfer element (i.e. conveying portion) may extend into the storage chamber so as to be in contact with (e.g. at least partially submerged in) the aerosol precursor. Hence, the liquid transfer element may be configured to convey the aerosol precursor from the storage chamber to the aerosolisation chamber via a wicking/capillary action.

[0042] The aerosol may be sized to inhibit pulmonary penetration. The aerosol may be formed of particles with a mass median aerodynamic diameter that is greater than or equal to 15 microns, e.g. greater than 30 microns, or greater than 50 microns, or may be greater than 60 microns, or may be greater than 70 microns.

[0043] The aerosol may be sized for transmission within at least one of a mammalian oral cavity and a mammalian nasal cavity. The first aerosol may be formed by particles having a maximum mass median aerodynamic diameter that is less than 300 microns, or e.g. less than 200 microns, or less than 100 microns. Such a range of mass median aerodynamic diameter can produce aerosols which are sufficiently small to be entrained in an airflow caused by a user drawing air through the aerosol delivery device and to enter and extend through the oral

and or nasal cavity to activate the taste and/or olfactory receptors.

[0044] The size of aerosol formed without heating may be typically smaller than that formed by condensation of a vapour.

[0045] It is noted that the mass median aerodynamic diameter is a statistical measurement of the size of the particles/droplets in an aerosol. That is, the mass median aerodynamic diameter quantifies the size of the droplets that together form the aerosol. The mass median aerodynamic diameter may be defined as the diameter at which 50% of the particles/droplets by mass in the aerosol are larger than the mass median aerodynamic diameter and 50% of the particles/droplets by mass in the aerosol are smaller than the mass median aerodynamic diameter. The "size of the aerosol", as may be used herein, refers to the size of the particles/droplets that are comprised in the particular aerosol.

[0046] The above configuration of the aerosol delivery device may be representative of an activated state of the aerosol delivery device. The aerosol delivery device may additionally be configurable in a deactivated state. In the deactivated state, the liquid transfer element may be isolated from the aerosol precursor. This isolation may, for example, be provided by a plug (e.g. formed of silicone). The plug may be located at an end (i.e. upstream end) of the conduit (defined by the tank) so as to provide a barrier between the aerosol precursor in the storage chamber and the conveying portion of the liquid transfer element. Alternatively, the aerosol delivery device may comprise a duck bill valve, a split valve or diaphragm; or a sheet of foil isolating the liquid transfer element from the first aerosol precursor.

[0047] In the deactivated state, the air bleed channel may be sealed by a sealing element. The sealing element may, for example, be in the form of a bung or plug (e.g. a silicone bung or plug). At least a portion of the bung may be received in the air bleed channel when the aerosol delivery device is in the deactivated state, so as to block the passage of airflow through the air bleed channel. The sealing element may alternatively be in the form of a pierceable membrane (e.g. formed of a metal foil) extending across the air bleed channel.

[0048] The mouthpiece/device housing of the device may be movable relative to the tank defining the storage chamber. The mouthpiece/device housing may be movable relative to the air bleed channel. In particular, movement of the mouthpiece/device housing may be in the longitudinal direction of the aerosol delivery device.

[0049] The mouthpiece may comprise an activation member, which may protrude internally (in an upstream direction) from an internal surface of the mouthpiece. When the mouthpiece/device housing is moved longitudinally in an upstream direction i.e. towards the storage tank, a distal end of the activation member may engage the sealing element so as to move the sealing element (i.e. in the upstream direction) relative to the air bleed channel. This movement of the sealing element may

open the air bleed channel, so as to allow airflow there-through and so as to move the aerosol delivery device to the activated state.

[0050] When the sealing element is a bung, the bung may comprise an enlarged end that extends fully across the air bleed channel, and a neck portion that extends only partway across the air bleed channel. Movement of the bung along the air bleed channel by the activation member may cause the enlarged end of the bung to move into the storage chamber such that only the neck portion remains in the air bleed channel. Thus, airflow may be permitted through the air bleed channel between the neck portion and the walls of the air bleed channel.

[0051] When the sealing element is a pierceable membrane, the activation member may pierce the pierceable membrane when moved in the upstream direction. To facilitate such piercing, the activation member may be in the form of a blade, or may be pointed.

[0052] The movement of the mouthpiece/device housing may also cause longitudinal upstream movement of the liquid transfer element through the conduit defined by the tank. The conveying portion of the liquid transfer element may engage the plug (or duck bill valve, split valve, etc.) so as to disengage the plug from the end of the conduit. Removal of the plug in this way means that the conveying portion comes into contact with the aerosol precursor (i.e. so as to be able to convey the aerosol precursor to the aerosol generating portion of the liquid transfer element).

[0053] The above components of the aerosol delivery device may collectively be referred to as an (additive) delivery article or (flavour) pod of the aerosol delivery device.

[0054] The aerosol delivery device may further comprise a cartomizer. The (additive) delivery article/(flavour) pod may be engageable with the cartomizer, for example, by way of an interference fit, snap-engagement, bayonet locking arrangement, etc. In other embodiments, the (additive) delivery article/(flavour) pod and cartomizer may be integrally formed.

[0055] The device housing may comprise opposing recesses or apertures for engagement with respective lugs provided on the cartomizer to secure the device housing to the cartomizer. There may be two sets of longitudinally spaced lugs and two sets of longitudinally spaced apertures with only the downstream lugs engaged within the upstream apertures when the device is in its deactivated state. Movement of the mouthpiece/device housing causes engagement of the upstream lugs in the upstream apertures and the downstream lugs in the downstream apertures.

[0056] The cartomizer may comprise a vaporising chamber and a vapour outlet for fluid flow therethrough. The vapour outlet may be fluidly connected to the flow passage of the additive delivery article/flavour pod. The vapour outlet and vaporising chamber may fluidly connect a cartomizer inlet opening and the inlet of the flow passage. Thus, an airflow may be drawn into and through

the cartomizer, and subsequently through the additive delivery article/flavour pod.

[0057] The aerosol precursor stored in the storage chamber (and conveyed by the liquid transfer element) may be a first aerosol precursor, and the aerosol formed from the first aerosol precursor may be a first aerosol. The aerosol delivery device (i.e. cartomizer) may comprise a reservoir defined by a container for containing a second aerosol precursor (which may be an e-liquid). The second aerosol precursor may, for example, comprise a base liquid and a physiologically active compound e.g. nicotine. The base liquid may include an aerosol former such as propylene glycol and/or vegetable glycerine.

[0058] At least a portion of the container may be translucent. For example, the container may comprise a window to allow a user to visually assess the quantity of second aerosol precursor in the container. The cartomizer may be referred to as a "clearomizer" if it includes a window. The vapour outlet may extend longitudinally through the container, wherein an outlet wall of the vapour outlet may define the inner wall of the container. In this respect, the container may surround the vapour outlet, such that the container may be generally annular.

[0059] The aerosol delivery device (i.e. the cartomizer) may comprise a vaporiser. The vaporiser may be located in the vaporising chamber.

[0060] The vaporiser may comprise a wick. The vaporiser may further comprise a heater. The wick may comprise a porous material. A portion of the wick may be exposed to fluid flow in the vaporising chamber. The wick may also comprise one or more portions in contact with the second aerosol precursor stored in the reservoir. For example, opposing ends of the wick may protrude into the reservoir and a central portion (between the ends) may extend across the vaporising chamber so as to be exposed to air flow in the vaporising chamber. Thus, fluid may be drawn (e.g. by capillary action) along the wick, from the reservoir to the exposed portion of the wick.

[0061] The heater may comprise a heating element, which may be in the form of a filament wound about the wick (e.g. the filament may extend helically about the wick). The filament may be wound about the exposed portion of the wick. The heating element may be electrically connected (or connectable) to a power source. Thus, in operation, the power source may supply electricity to (i.e. apply a voltage across) the heating element so as to heat the heating element. This may cause liquid stored in the wick (i.e. drawn from the reservoir) to be heated so as to form a vapour and become entrained in fluid/air flowing through the vaporising chamber. This vapour may subsequently cool to form an aerosol in the vapour outlet. This aerosol is hereinafter referred to as the second aerosol. This aerosol generation may be referred to as "active" aerosol generation, because it makes use of heat to generate the aerosol.

[0062] This second aerosol may subsequently flow from the vapour outlet to (and through) the flow passage

and aerosolisation chamber of the additive delivery article/flavour pod (e.g. when engaged with the cartomizer). Thus, the fluid received through the mouthpiece aperture of the aerosol delivery device may be a combination of the first aerosol and the second aerosol.

[0063] The second aerosol generated is sized for pulmonary penetration (i.e. to deliver an active ingredient such as nicotine to the user's lungs). The second aerosol is formed of particles having a mass median aerodynamic diameter of less than or equal to 10 microns, preferably less than 8 microns, more preferably less than 5 microns, yet more preferably less than 1 micron. Such sized aerosols tend to penetrate into a human user's pulmonary system, with smaller aerosols generally penetrating the lungs more easily. The second aerosol may also be referred to as a vapour.

[0064] The (additive) delivery article ((flavour) pod) and/or cartomizer may be a consumable part of an aerosol delivery system. In this regard, the device may be a termed "a consumable".

[0065] In a second aspect there is provided an aerosol delivery device comprising:

a mouthpiece comprising an end surface at a longitudinal end of the mouthpiece, and a mouthpiece aperture formed in the end surface;

an aerosolisation chamber extending longitudinally into the device from the mouthpiece aperture;

a storage chamber for storing an aerosol precursor; and

an elongate porous liquid transfer element comprising:

an aerosol generating portion at least partly received in the aerosolisation chamber, the aerosol generating portion comprising a transversely extending distal end surface that is substantially planar; and

a conveying portion for conveying liquid from the storage chamber to the aerosol generating portion, a transverse cross-sectional area of the conveying portion being smaller than a transverse cross-sectional area of the aerosol generating portion.

[0066] The aerosol generating portion may thus define an enlarged portion of the liquid transfer element. A transversely (e.g. radially) extending transition surface of the liquid transfer element may define a step between the conveying portion and the aerosol generating portion.

[0067] The aerosol delivery device may otherwise be as described above with respect to the first aspect.

[0068] In a third aspect there is provided an aerosol delivery system comprising a base unit having a power

source, and a device as described above with respect to the first or second aspects.

[0069] The device may be engageable with the base unit such that the vaporiser of the device/consumable is connected to the power source of the base unit.

[0070] For example, the cartomizer may be configured for engagement with the base unit. The cartomizer and the additive delivery article/flavour pod may be a single consumable component of the aerosol delivery system (when integrally formed) or may each define separate consumable components of the aerosol delivery system (when engageable with one another).

[0071] The first aerosol precursor and second aerosol precursor may be replenished by replacing a used consumable with an unused consumable.

[0072] The base unit and the device/consumable (e.g. the cartomizer of the consumable) may be configured to be physically coupled together. For example, the device/consumable may be at least partially received in a recess of the base unit, such that there is snap engagement between the base unit and the consumable. Alternatively, the base unit and the device/consumable may be physically coupled together by screwing one onto the other, or through a bayonet fitting.

[0073] Thus, the device/consumable may comprise one or more engagement portions for engaging with a base unit. In this way, one end of the device/consumable (i.e. the inlet end) may be coupled with the base unit, whilst an opposing end (i.e. the outlet end) of the consumable may define the mouthpiece.

[0074] The base unit or the device/consumable may comprise a power source or be connectable to a power source. The power source may be electrically connected (or connectable) to the heater. The power source may be a battery (e.g. a rechargeable battery). An external electrical connector in the form of e.g. a USB port may be provided for recharging this battery.

[0075] The device/consumable may comprise an electrical interface for interfacing with a corresponding electrical interface of the base unit. One or both of the electrical interfaces may include one or more electrical contacts. Thus, when the base unit is engaged with the consumable, the electrical interface may be configured to transfer electrical power from the power source to a heater of the device/consumable. The electrical interface may also be used to identify the consumable from a list of known types. The electrical interface may additionally or alternatively be used to identify when the device/consumable is connected to the base unit.

[0076] The base unit may alternatively or additionally be able to detect information about the consumable via an RFID reader, a barcode or QR code reader. This interface may be able to identify a characteristic (e.g. a type) of the consumable. In this respect, the device/consumable may include any one or more of an RFID chip, a barcode or QR code, or memory within which is an identifier and which can be interrogated via the interface.

[0077] The base unit may comprise a controller, which

may include a microprocessor. The controller may be configured to control the supply of power from the power source to the heater (e.g. via the electrical contacts). A memory may be provided and may be operatively connected to the controller. The memory may include non-volatile memory. The memory may include instructions which, when implemented, cause the controller to perform certain tasks or steps of a method.

[0078] The base unit may comprise a wireless interface, which may be configured to communicate wirelessly with another device, for example a mobile device, e.g. via Bluetooth®. To this end, the wireless interface could include a Bluetooth® antenna. Other wireless communication interfaces, e.g. WiFi®, are also possible. The wireless interface may also be configured to communicate wirelessly with a remote server. An airflow (i.e. puff) sensor may be provided that is configured to detect a puff (i.e. inhalation from a user). The airflow sensor may be operatively connected to the controller so as to be able to provide a signal to the controller that is indicative of a puff state (i.e. puffing or not puffing). The airflow sensor may, for example, be in the form of a pressure sensor or an acoustic sensor. The controller may control power supply to the heater in response to airflow detection by the sensor. The control may be in the form of activation of the heater in response to a detected airflow. The airflow sensor may form part of the device or the base unit.

[0079] In an alternative embodiment the aerosol delivery device may be a non-consumable device in which one or both of the first and second aerosol precursors of the device may be replenished by re-filling the reservoir or storage chamber of the device (rather than replacing the consumable). In this embodiment, the consumable described above may instead be a non-consumable component that is integral with the base unit. For example, the only consumable portion may be the first and/or second aerosol precursor contained in reservoir and storage chamber of the device. Access to the reservoir and/or storage chamber (for re-filling of the aerosol precursor) may be provided via e.g. an opening to the reservoir and/or storage chamber that is sealable with a closure (e.g. a cap).

[0080] The aerosol delivery device may be a smoking substitute device (e.g. an e-cigarette device). The consumable of the aerosol delivery device be a smoking substitute consumable (e.g. an e-cigarette consumable). The aerosol delivery system may be a smoking substitute system (e.g. an e-cigarette system).

[0081] In a fourth aspect there is provided a method of using a smoking substitute system as described above with respect to the second aspect, the method comprising engaging the device/consumable with the base unit so as to connect the vaporiser of the device/consumable with the power source of the base unit. The method may comprise engaging an additive delivery article/flavour pod of the device/consumable with a cartomizer of the device/consumable, such that a flow passage of the additive delivery article/flavour pod is in fluid communication

with the vapour outlet of the cartomizer.

[0082] The invention includes the combination of the aspects and preferred features described except where such a combination is clearly impermissible or expressly avoided.

Summary of the Figures

[0083] So that the invention may be understood, and so that further aspects and features thereof may be appreciated, embodiments illustrating the principles of the invention will now be discussed in further detail with reference to the accompanying figures, in which:

Figures 1A and 1B is a schematic drawing of an aerosol delivery system according to a first embodiment;

Figures 2A and 2B is a schematic drawing of an aerosol delivery system according to a second embodiment;

Figure 3A is a cross-sectional view of a consumable, according to a third embodiment, in a deactivated state;

Figure 3B is a cross-sectional view of the consumable of Figure 3A in an activated state;

Figure 3C is a cross-sectional schematic view of the flavour pod portion of the consumable of the third embodiment;

Figure 4A is a cross-sectional view of a consumable, according to a fourth embodiment, in a deactivated state;

Figure 4B is a cross-sectional view of a consumable, according to a fourth embodiment, in an activated state; and

Figure 4C is a detailed cross-sectional view of the mouthpiece of a consumable according to the embodiment.

Detailed Description of the Invention

[0084] Aspects and embodiments of the present invention will now be discussed with reference to the accompanying figures. Further aspects and embodiments will be apparent to those skilled in the art.

[0085] Referring to figures 1A and 1B, there is shown a schematic view of an aerosol delivery system in the form of a smoking substitute system 10. In this example, the smoking substitute system 10 comprises a cartomizer 101 and an additive delivery article in the form of a flavour pod 102 connected to a base unit 100. In this example, the base unit 100 includes elements of the smoking substitute system 10 such as a battery, an electronic con-

troller, and a pressure transducer (not shown). The cartomizer 101 may engage with the base unit 100 via a push-fit engagement, a screw-thread engagement, or a bayonet fit, for example. A cartomizer may also be referred to as a "pod".

[0086] The flavour pod 102 is configured to engage with the cartomizer 101 and thus with the base unit 100. The flavour pod 102 may engage with the cartomizer 101 via a push-fit engagement, a screw-thread engagement, or a bayonet fit, for example. Figure 1B illustrates the cartomizer 101 engaged with the base unit 100, and the flavour pod 102 engaged with the cartomizer 101. As will be appreciated, in this example, the cartomizer 101 and the flavour pod 102 are distinct elements.

[0087] As will be appreciated from the following description, in other embodiments the cartomizer 101 and the flavour pod 102 may be combined into a single component that implements the combined functionality of the cartomizer 101 and flavour pod 102. Such a single component may also be referred to as an aerosol delivery device. In other examples, the cartomizer may be absent, with only a flavour pod 102 present.

[0088] As is set forth above, reference to a "consumable" component may mean that the component is intended to be used once until exhausted, and then disposed of as waste or returned to a manufacturer for re-processing.

[0089] Referring to figures 2A and 2B, there is shown a smoking substitute system 20 comprising a base unit 200 and a consumable 203. The consumable 203 combines the functionality of the cartomizer 201 and the flavour pod 202. In Figure 2A, the consumable 203 and the base unit 200 are shown separated from one another. In Figure 2B, the consumable 203 and the base unit 200 are engaged with each other to form the smoking substitute system 20.

[0090] Referring to Figure 3A, there is shown a consumable 303 engagable with a base unit (not shown) via a push-fit engagement. The consumable 303 is shown in a deactivated state. The consumable 303 may be considered to have two portions - a cartomizer portion 301 and flavour pod portion 302 (i.e. additive delivery article), both of which are located within a single consumable component 303 (as in figures 2A and 2B). It should, however, be appreciated that in a variation, the cartomizer portion 301 and flavour pod portion 302 may be separate (but engageable) components.

[0091] The consumable 303 includes an upstream cartomizer inlet opening 306 and a downstream mouthpiece aperture 307 (i.e. defining an outlet of the consumable 303). In other examples a plurality of inlets and/or outlets are included. Between, and fluidly connecting, the inlet opening 306 and the mouthpiece aperture 307 there is an airflow passage comprising (in a downstream flow direction) a vaporising chamber 325 of the cartomizer, a vapour outlet 323 (also of the cartomizer), a downstream flow passage 321 (hereinafter referred to as the vapour flow passage) of the flavour pod portion 302, and an aer-

osolisation chamber 319 (also of the flavour pod portion 302). The mouthpiece aperture 307 is located at the mouthpiece 309 of the consumable 303.

[0092] The aerosolisation chamber 319 extends longitudinally in an upstream direction from the mouthpiece aperture 307. The aerosolisation chamber 319 is cylindrical (having a circular cross-sectional shape) such that a transverse cross-sectional area of the aerosolisation chamber 319 is uniform along a longitudinal length of the aerosolisation chamber 319. The aerosolisation chamber 319 is defined by a tube 337 that extend longitudinally from a longitudinal end surface of the device.

[0093] The consumable 303 includes a flavour pod portion 302. The flavour pod portion 302 is configured to generate a first (flavoured) aerosol for output from the mouthpiece aperture 307. The flavour pod portion 302 of the consumable 303 includes a liquid transfer element 315. This liquid transfer element 315 acts as a passive aerosol generator (i.e. an aerosol generator which does not use heat to form the aerosol), and is formed of a porous material. The liquid transfer element 315 comprises a conveying portion 317 and an aerosol generating portion 322, which is located in aerosolisation chamber 319. In this example, the aerosol generating portion 322 is a porous nib.

[0094] When activated, as discussed in more detail below, a storage chamber 316 (defined by a tank 318) for storing a first aerosol precursor (i.e. a liquid comprising a flavourant) is fluidly connected to the liquid transfer element 315. The flavoured aerosol precursor, in this embodiment, is stored in a porous body within the storage chamber 316 (but may be a free-liquid). In the activated state, the liquid transfer element 315 is in contact with the flavoured aerosol precursor stored in the storage chamber 316 by way of contact with the porous body/free liquid.

[0095] The liquid transfer element 315 comprises an aerosol generating portion 322 and a conveying portion 317. The aerosol generating portion 322 is located at a downstream end (top of Figure 3A) of the liquid transfer element 315, whilst the conveying portion 317 forms the remainder of the liquid transfer element 315. The conveying portion 317 is elongate and substantially cylindrical.

[0096] A distal (i.e. downstream) transversely extending end surface 329 of the aerosol generating portion 322 is planar, such that the aerosol generating portion 322 has a somewhat truncated bulb or bullet-shape. The aerosol generating portion 322 is wider (has a greater radius) than the conveying portion 317. As is apparent from Figure 4C (which will be discussed further below) the greater radius of the aerosol generating portion 322 means that a transverse transition surface 336, in the form of a step, is defined between the downstream end of the conveying portion 317 and the upstream end of the aerosol generating portion 322.

[0097] The liquid transfer element 315 extends into and through the storage chamber 316, such that the convey-

ing portion 317 is in contact with the contents of the storage chamber 316. In particular, an inner wall of the tank 318 defines a conduit 324, through which the liquid transfer element 315 extends. The liquid transfer element 315 and the conduit 324 are located in a substantially central position within the storage chamber 316 and are substantially parallel to a central longitudinal axis of the consumable 303.

[0098] The porous nature of the liquid transfer element 315 means that first (flavoured) aerosol precursor in the storage chamber 316 is drawn into the liquid transfer element 315. As the flavoured aerosol precursor in the liquid transfer element 315 is depleted in use, further flavoured aerosol precursor is drawn from the storage chamber 316 into the liquid transfer element 315 via a wicking action.

[0099] Before activation, the storage chamber 316 is fluidly isolated from the liquid transfer element 315. In this example, the isolation is achieved via a plug 320 (preferably formed from silicone) located at one end of a conduit 324 surrounding the liquid transfer element 315. In other examples, the plug may be replaced by any one of: a duck bill valve; a split valve or diaphragm; or a sheet of foil.

[0100] The storage chamber 316 further includes an air bleed channel 332, which in the deactivated state is sealed by a sealing element comprising a pierceable membrane (preferably made from foil). Activation (or piercing) member 330, which projects inwardly from the mouthpiece 309, and may take the form of a blade, pierces the pierceable membrane and opens the air bleed channel 332 when the consumable is moved to the activated state (as is discussed in more detail below).

[0101] The liquid transfer element 315 (i.e. the aerosol generating portion 322) is located within the aerosolisation chamber 319, such that an airflow path is defined between the liquid transfer element 315 an inner surface of the tube 337 defining the aerosolisation chamber 319. This airflow path comprises a constricted region which is defined by the aerosol generating portion 322. This constriction results in increased air velocity and a corresponding reduction in air pressure of the air flowing along the airflow path and thus the constricted region may be referred to as a Venturi aperture. Although not shown, in some embodiments, one or more supports may extend inwardly from the wall defining the aerosolisation chamber 319 (e.g. tube 337) to contact the aerosol generating portion 322 and to support the aerosol generating portion 322 within the aerosolisation chamber 319.

[0102] The cartomizer portion 301 of the consumable 303 includes a reservoir 305 (defined by a container) for storing a second (e-liquid) aerosol precursor (which may contain nicotine). A wick 311 extends into the reservoir so as to be in contact with (i.e. partially submerged in) the e-liquid aerosol precursor. The wick 311 is formed from a porous wicking material (e.g. a polymer) that draws the e-liquid aerosol precursor from the reservoir 305 into a central region of the wick 311 that is located

in the vaporising chamber 325.

[0103] A heater 314 is configured to heat the central region of the wick 311. The heater 314 includes a resistive heating filament that is coiled around the central region of the wick 311. The wick 311 and the heater 314 generally define a vaporiser, and together with the reservoir 305 act as an active aerosol generator. The vaporiser (i.e. wick 311 and heater 314) and aerosol generating portion 322 are both at least partially located within the airflow passage, with the aerosol generating portion 322 being downstream of the vaporiser.

[0104] So that the consumable 303 may be supplied with electrical power for activation of the heater 314, the consumable 303 includes a pair of consumable electrical contacts 313. The consumable electrical contacts 313 are configured for electrical connection to a corresponding pair of electrical supply contacts in the base unit (not shown). The consumable electrical contacts 313 are electrically connected to the electrical supply contacts (not shown) when the consumable 303 is engaged with the base unit. The base unit includes an electrical power source, for example a battery.

[0105] Figure 3B shows the consumable 303 of Figure 3A in an activated state. To transition from the deactivated state to the activated state, mouthpiece 309 is moved along a central longitudinal axis 350 in an upstream direction towards cartomizer portion 301. The mouthpiece 309 is fixed by a collar 308 to the conveying portion 317 of the liquid transfer element 315 and therefore liquid transfer element 315 moves with the mouthpiece 309. The mouthpiece 309 and liquid transfer element 315 are moved relative to the tank 316.

[0106] When the mouthpiece 309 is moved upstream, activation/piercing member 330 contacts and pierces a sealing element in the form of a pierceable membrane extending across the air bleed channel 332 thereby fluidly connecting the vapour flow passage 321 the storage chamber 316. This allows air from the vapour flow passage 321 to enter the storage chamber 316 as aerosol precursor is removed from the storage chamber 316 by the liquid transfer element 315.

[0107] In addition to piercing of the membrane by the piercing member 330, liquid transfer element 315 pushes on, and moves, plug 320 out of the conduit 324 which then allows liquid transfer element 315 to come into contact with the flavoured aerosol precursor stored in the storage chamber 316. The plug 320 may then be unconstrained within the storage chamber, or may be pushed by liquid transfer element 315 into a holding location.

[0108] Once activated, and in use, a user draws (or "sucks", "pulls", or "puffs") on the mouthpiece 309 of the consumable 303, which causes a drop in air pressure at the mouthpiece aperture 307, thereby generating air flow through the inlet opening 306, along the airflow passage, out of the mouthpiece aperture 307 and into the user's mouth.

[0109] When the heater 314 is activated by passing an electric current through the heating filament in response

to the user drawing on the mouthpiece 309 (the drawing of air may be detected by a pressure transducer), the e-liquid located in the wick 311 adjacent to the heating filament is heated and vaporised to form a vapour in the vaporising chamber 325. The vapour condenses to form the e-liquid aerosol within the vapour outlet 323. The e-liquid aerosol is entrained in an airflow along the vapour flow passage 321, through the aerosolisation chamber 319, to the mouthpiece aperture 307 for inhalation by the user when the user draws on the mouthpiece 309.

[0110] The base unit supplies electrical current to the consumable electrical contacts 113. This causes an electric current flow through the heating filament of the heater 314 and the heating filament heats up. As described, the heating of the heating filament causes vaporisation of the e-liquid in the wick 311 to form the e-liquid aerosol.

[0111] As the air flows through the aerosolisation chamber 319, the constricted region of the air path results in an increase in air velocity and corresponding decrease in air pressure in the airflow in the vicinity of the porous aerosol generating portion 322. The corresponding low pressure and high air velocity region causes the generation of the flavoured aerosol from the porous surface of the aerosol generating portion 322 of the liquid transfer element 315. The flavoured aerosol becomes entrained in the airflow and ultimately is output from the mouthpiece aperture 307 of the consumable 303 and into the user's mouth.

[0112] The flavoured aerosol is sized to inhibit pulmonary penetration. The flavoured aerosol is formed of particles with a mass median aerodynamic diameter that is greater than 70 microns. The flavoured aerosol is sized for transmission within at least one of a mammalian oral cavity and a mammalian nasal cavity. The flavoured aerosol is formed by particles having a maximum mass median aerodynamic diameter that is less than 100 microns. Such a range of mass median aerodynamic diameter will produce aerosols which are sufficiently small to be entrained in an airflow caused by a user drawing air through the device and to enter and extend through the oral and or nasal cavity to activate the taste and/or olfactory receptors.

[0113] The e-liquid aerosol generated is sized for pulmonary penetration (i.e. to deliver an active ingredient such as nicotine to the user's lungs). The e-liquid aerosol is formed of particles having a mass median aerodynamic diameter of less than 1 micron. Such sized aerosols tend to penetrate into a human user's pulmonary system, with smaller aerosols generally penetrating the lungs more easily. The e-liquid aerosol may also be referred to as a vapour.

[0114] The size of aerosol formed without heating is typically smaller than that formed by condensation of a vapour.

[0115] Figure 3C illustrates the flow of vapour through the flavour pod portion 302 of figures 3A and 3B. The flavour pod portion 302 is shown in the activated state. The cartomizer is not shown, but it should be appreciated

that the flavour pod portions 302 is engaged with the cartomizer 301 of figures 3A and 3B. In other embodiments, however, the consumable 303 may not comprise a cartomizer portion, and may provide only flavour to the user.

[0116] As is provided above, the flavour pod portion 302 comprises an upstream (i.e. upstream with respect to flow of air in use) vapour passage inlet 304 (in fluid communication with the vapour outlet 323) and a downstream (i.e. downstream with respect to flow of air in use) outlet in the form of a mouthpiece aperture 307. Between, and fluidly connecting the vapour passage inlet 304 and the mouthpiece aperture 307, is a vapour flow passage 321 and aerosolisation chamber 319.

[0117] The vapour flow passage 321 comprises a transverse portion 321a. The airflow path through the device deflects at the vapour passage inlet 304 i.e. there is a deflection between the vapour outlet 323 and the transverse portion 321a of the vapour flow passage 321.

[0118] The vapour flow passage 321 then deflects again from the transverse portion 321a to a longitudinal portion 321b which extends generally longitudinally between a device housing 310 (which is integral with the mouthpiece 309) and the tank 318. The vapour flow passage 321 deflects again at the upper surface of the tank 318 within the mouthpiece 309 such that airflow/vapour is directed through the aerosolisation chamber 319, towards the mouthpiece aperture 307.

[0119] The vapour flow passage 321 may be a single (annular) flow passage around the tank 318 or it may comprises two branches which split around the tank 318 and re-join within the mouthpiece 309 proximal the liquid transfer element 315.

[0120] In use, when a user draws on the mouthpiece 309, airflow is generated through the airflow passage through the device. Air (comprising the e-liquid aerosol from the cartomizer portion 301 as explained above with respect to Figure 3A) flows through the vapour outlet 323 and into the vapour passage 321. Further downstream, as air flows past the aerosol generating portion 322 in the aerosolisation chamber 319, the velocity of the air increases, resulting in a drop in air pressure. As a result, the flavoured aerosol precursor held in the aerosol generating portion 322 becomes entrained in the air so as to form the flavoured aerosol. The flavoured aerosol has the particle size and other properties described above with respect to Figure 3A.

[0121] As the flavoured aerosol precursor becomes entrained within the air, the liquid transfer element 315 transfers further flavoured aerosol precursor from the storage chamber 316 to the aerosol generating portion 322. More specifically, the liquid transfer element wicks the flavoured aerosol precursor from the storage chamber 316 to the aerosol generating portion 322.

[0122] Figures 4A and 4B illustrate a further embodiment of a consumable 404 of an aerosol delivery device. This embodiment includes many of the same features of the embodiment described above and shown in Figures

3A-3E and, for that reason, corresponding reference numerals have been used (albeit with a unit increase of the first digit to represent the further embodiment). The description of those features have not been repeated here. Figure 4A shows the consumable 404 in a deactivated state and Figure 4B shows the consumable 404 in an activated state.

[0123] Unlike the previously described embodiment, the presently illustrated embodiment comprises a different mechanism for opening the air bleed channel 432 upon activation of the consumable 403. In this embodiment, when in the deactivated state (Figure 4A) the air bleed channel 432 is obstructed by a silicone bung 433 sealing element received in the air bleed channel 432. In particular, a body 434 of the bung 433 is received in the air bleed channel 432, but does not fully obstruct the air bleed channel 432. That is, a portion of the air bleed channel 432 remains unobstructed by the body 434 of the bung 433. However, an enlarged head 435 of the bung 433, which is located in the storage chamber 416, extends fully across the entrance to the air bleed channel 432 so as to obstruct the channel 432.

[0124] When the mouthpiece 409 is moved in the upstream longitudinal direction to activate the consumable 403, an elongate activation member (extending inwardly from the mouthpiece 409) engages the body 434 of the bung 433 and pushes the bung 433 in the upstream direction (see Figure 4B). This moves the enlarged head 435 of the bung 433 away from the entrance of the air bleed channel 432 such that the head 435 no longer obstructs the air bleed channel 432. This allows air to pass from the vapour flow passage 421 and into the storage chamber 416 (which, in turn, allows for flow of the flavoured aerosol precursor from the storage chamber 416).

[0125] It should be noted that the bung sealing element shown in Figures 4A and 4B could be used in place of the pierceable membrane in Figures 3A and 3B and vice versa.

[0126] The aerosol generating portion 422 of the liquid transfer element shown in the Figures 4A and 4B has a flattened/planar upper (downstream) end surface, which is similar to that shown in Figure 3A to 3C. This is better seen in Figure 4C, which shows the mouthpiece 409 of the embodiment of Figures 4A and 4B in more detail.

[0127] As is apparent from this figure, the conveying portion 417 has a smaller cross-sectional area than the aerosol generating portion 422 of the liquid transfer element 415. As a result, a step (from the conveying portion 317 to the aerosol generating portion 422) is defined by a radial transition surface 436. The transition surface 436 has a concave profile such that there is a smooth transition between the conveying portion 317 and the transition surface 436 and a sharp/hard edge between the transition surface 436 and the aerosol generating portion 422.

[0128] This edge is an upstream leading edge of the aerosol generating portion 422 and defines an upstream end of a constricted region 438 of an airflow path between the aerosol generating portion 422 and the tube 437 de-

fining the aerosolisation chamber 419. Downstream of this constricted region 438 is an expansion region 439. In this expansion region 329 the airflow path gradually increases in cross-sectional area in the downstream direction. This is a result of the aerosol generating portion 422 having a slight inward taper towards the planar distal end surface 429 and the cylindrical shape of the aerosolisation chamber 419.

[0129] Also shown in more detail in Figure 4C is the collar 408, which partially circumscribes the liquid transfer element 415. The collar 408 is connected to a mounting portion 440, which surrounds the tube 437 so as to mount the collar 408 to the tube 437. In this way, the liquid transfer element 415 is fixed with respect to the mouthpiece 409 (i.e. so as to move with the mouthpiece 409 between the activated and deactivated states discussed above).

[0130] The features disclosed in the foregoing description, or in the following claims, or in the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for obtaining the disclosed results, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

[0131] While the invention has been described in conjunction with the exemplary embodiments described above, many equivalent modifications and variations will be apparent to those skilled in the art when given this disclosure. Accordingly, the exemplary embodiments of the invention set forth above are considered to be illustrative and not limiting. Various changes to the described embodiments may be made without departing from the scope of the invention as defined in the claims.

[0132] For the avoidance of any doubt, any theoretical explanations provided herein are provided for the purposes of improving the understanding of a reader. The inventors do not wish to be bound by any of these theoretical explanations.

[0133] Any section headings used herein are for organizational purposes only and are not to be construed as limiting the subject matter described.

[0134] Throughout this specification, including the claims which follow, unless the context requires otherwise, the words "have", "comprise", and "include", and variations such as "having", "comprises", "comprising", and "including" will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

[0135] It must be noted that, as used in the specification and the appended claims, the singular forms "a," "an," and "the" include plural referents unless the context clearly dictates otherwise. Ranges may be expressed herein as from "about" one particular value, and/or to "about" another particular value. When such a range is expressed, another embodiment includes from the one particular value and/or to the other particular value. Similarly,

when values are expressed as approximations, by the use of the antecedent "about," it will be understood that the particular value forms another embodiment. The term "about" in relation to a numerical value is optional and means, for example, +/- 10%.

[0136] The words "preferred" and "preferably" are used herein refer to embodiments of the invention that may provide certain benefits under some circumstances. It is to be appreciated, however, that other embodiments may also be preferred under the same or different circumstances. The recitation of one or more preferred embodiments therefore does not mean or imply that other embodiments are not useful, and is not intended to exclude other embodiments from the scope of the disclosure, or from the scope of the claims.

Claims

1. An aerosol delivery device comprising:

a mouthpiece comprising an end surface at a longitudinal end of the mouthpiece, and a mouthpiece aperture formed in the end surface; an aerosolisation chamber extending longitudinally into the device from the mouthpiece aperture;

a storage chamber for storing an aerosol precursor; and

a porous liquid transfer element comprising an aerosol generating portion at least partly received in the aerosolisation chamber and a conveying portion for conveying liquid from the storage chamber to the aerosol generating portion, **characterised in that** a transverse cross-sectional area of the aerosolisation chamber is uniform along a longitudinal length of the aerosolisation chamber.

2. An aerosol delivery device according to claim 1 wherein the aerosol generating portion has a larger transverse cross-sectional area than a transverse cross-sectional area of the conveying portion.

3. An aerosol delivery device according to claim 2 wherein a transversely extending transition surface is defined between the conveying portion and the aerosol generating portion.

4. An aerosol delivery device according to claim 3 wherein the transition surface comprises a concave profile.

5. An aerosol delivery device according to any one of the preceding claims 1 or 2 wherein the aerosolisation chamber has a cylindrical shape.

6. An aerosol delivery device according to any one of

the preceding claims where a distal transversely extending end surface of the aerosol generating portion is substantially planar.

7. An aerosol delivery device according to claim 6 wherein the planar transversely extending end surface is spaced from the mouthpiece aperture in an upstream longitudinal direction.

8. An aerosol delivery device according to claim 7 wherein the spacing of the transversely extending end surface from the mouthpiece aperture is less than 1 mm.

9. An aerosol delivery device according to any one of the preceding claims wherein the aerosol generating portion is fully received in the aerosolisation chamber.

10. An aerosol delivery device according to claim 9 wherein an airflow path through the aerosolisation chamber is defined between the aerosol generating portion and one or more walls defining the aerosolisation chamber, the airflow path comprising a constricted region defining the narrowest part of the airflow path.

11. An aerosol delivery device according to claim 10 wherein the airflow path comprises an expansion region downstream of the constricted region.

12. An aerosol delivery device according to claim 11 wherein the cross-sectional area of the airflow path in the expansion region increase in the downstream direction.

13. An aerosol delivery device according to any one of the preceding claims comprising an inlet and a flow passage fluidly connecting the inlet to the aerosolisation chamber.

14. An aerosol delivery device according to any one of the preceding claims further comprising a cartomizer comprising a vaporiser in fluid communication with the inlet of the flow passage for delivering a vapour to the flow passage.

15. An aerosol delivery device system comprising an aerosol delivery device according to any one of the preceding claims and a base unit comprising a power source.

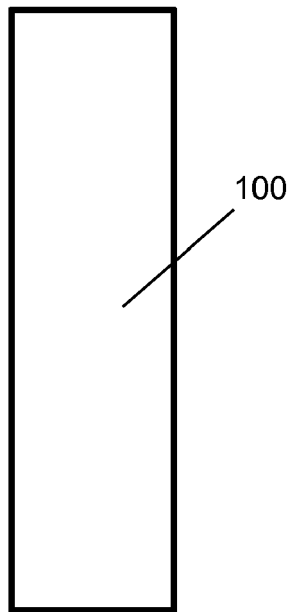
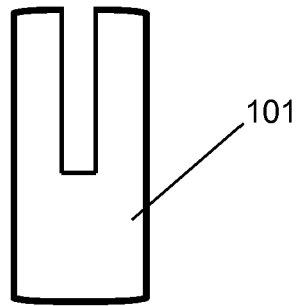
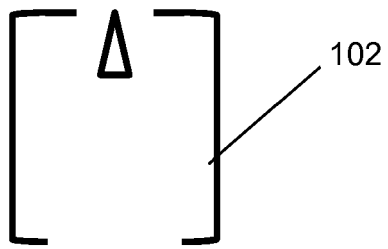


Fig. 1A

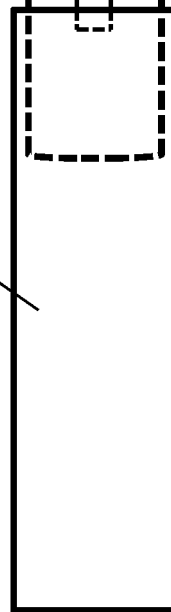
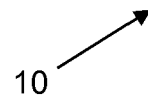
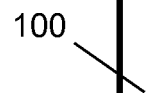
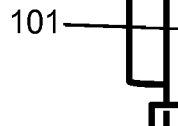
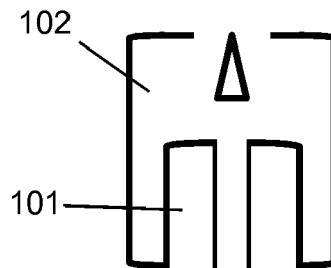


Fig. 1B

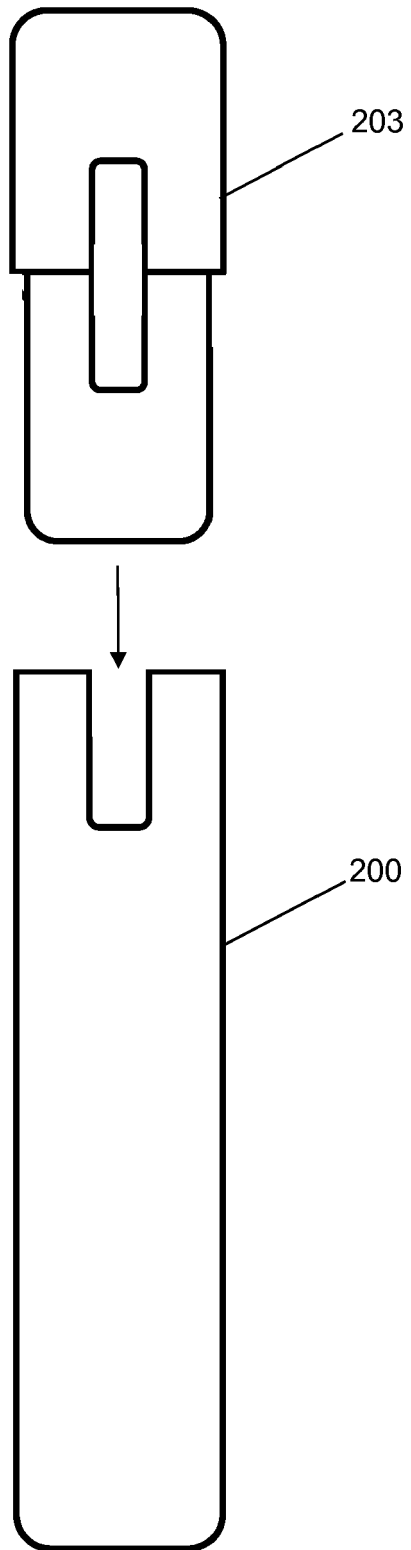


Fig. 2A

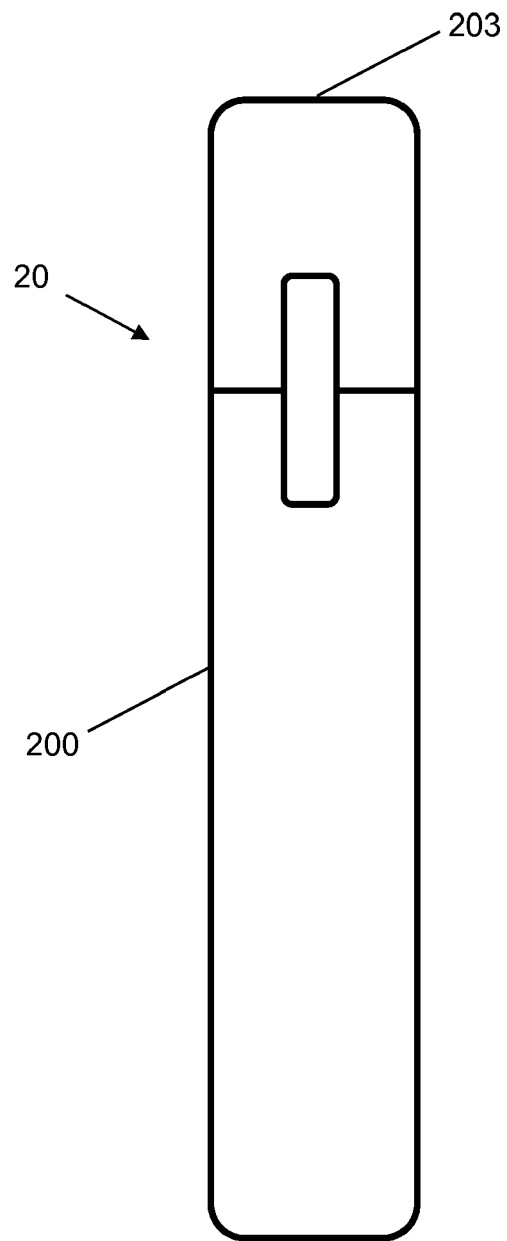


Fig. 2B

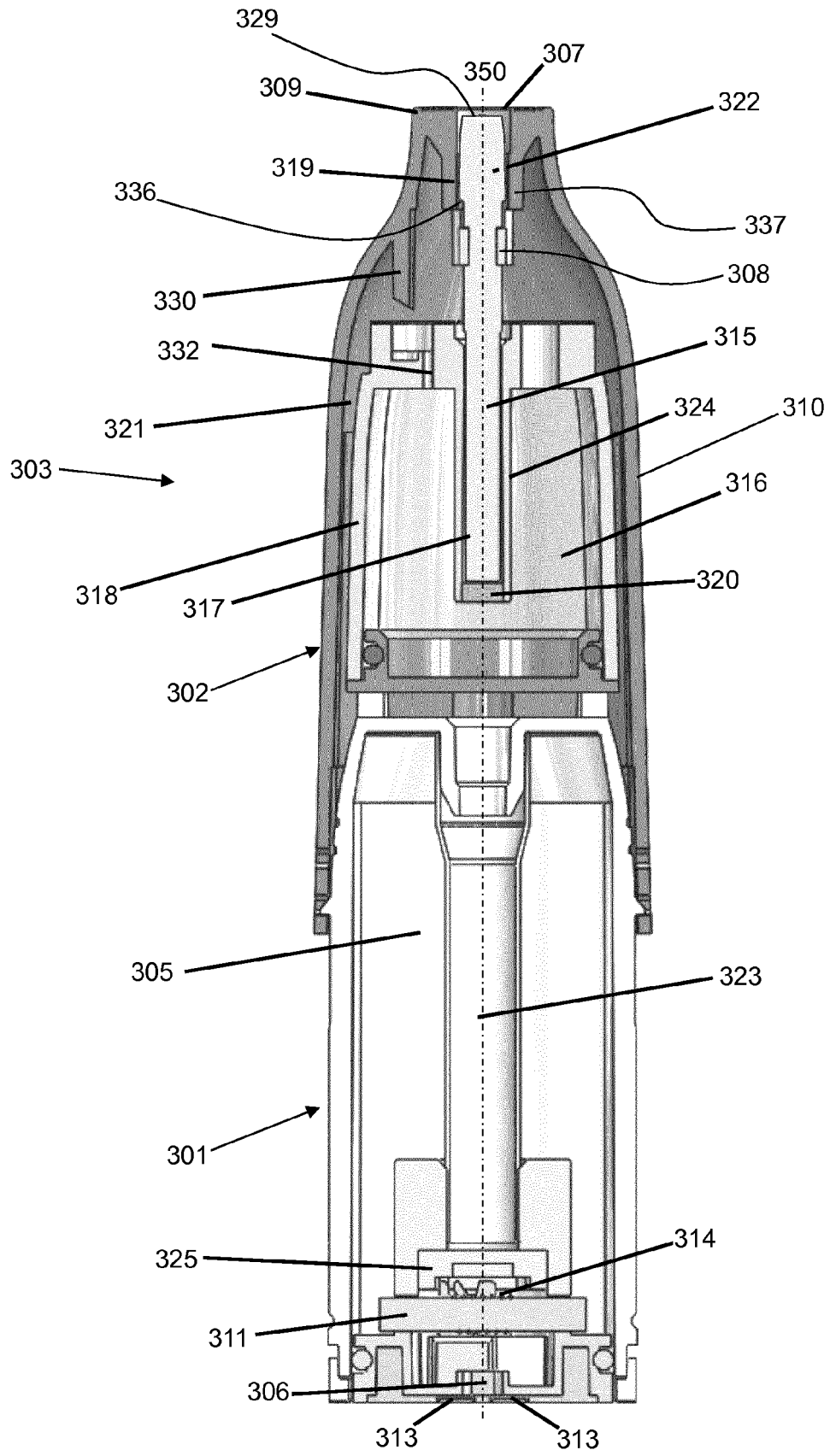


Fig. 3A

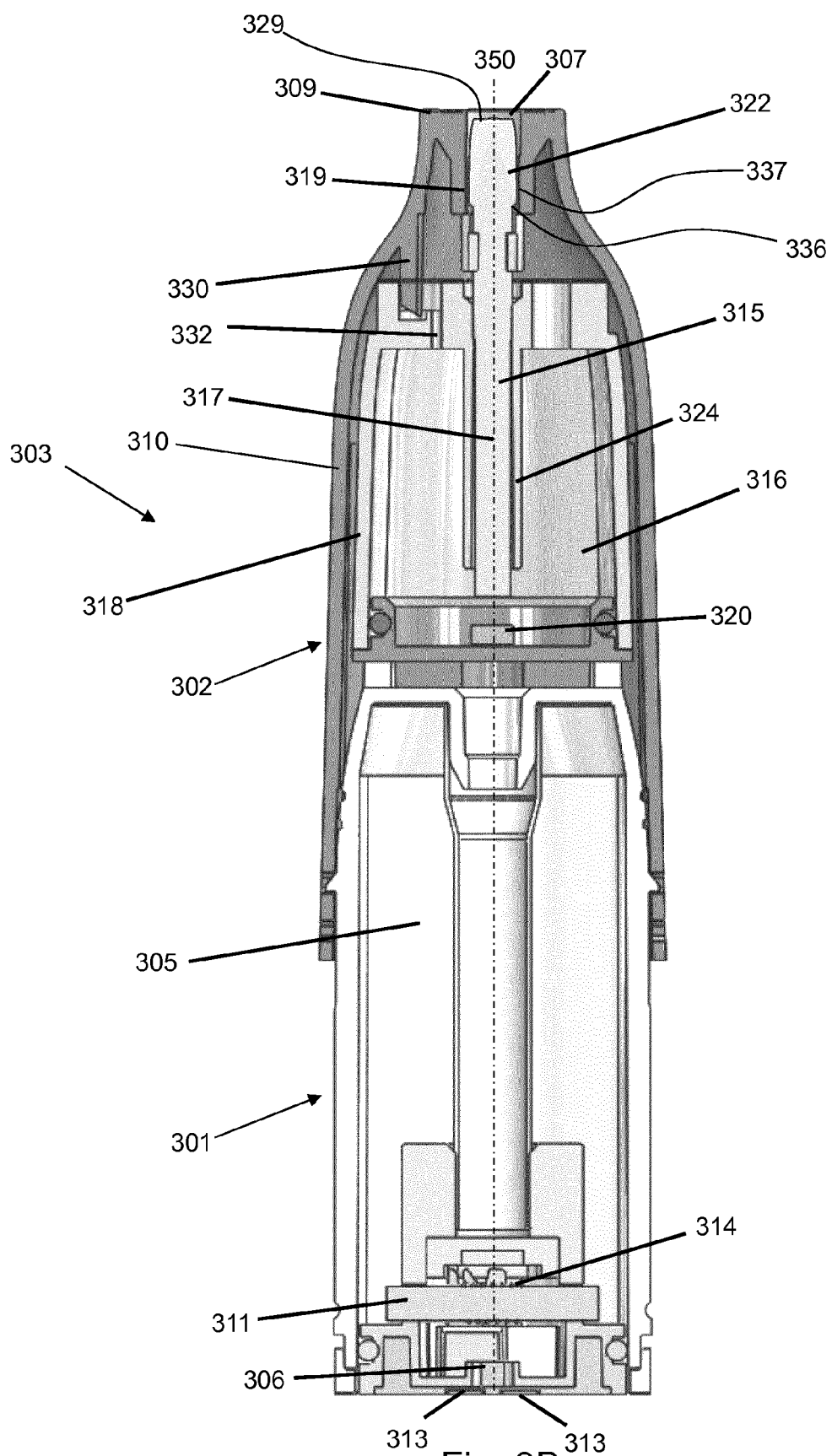


Fig. 3B

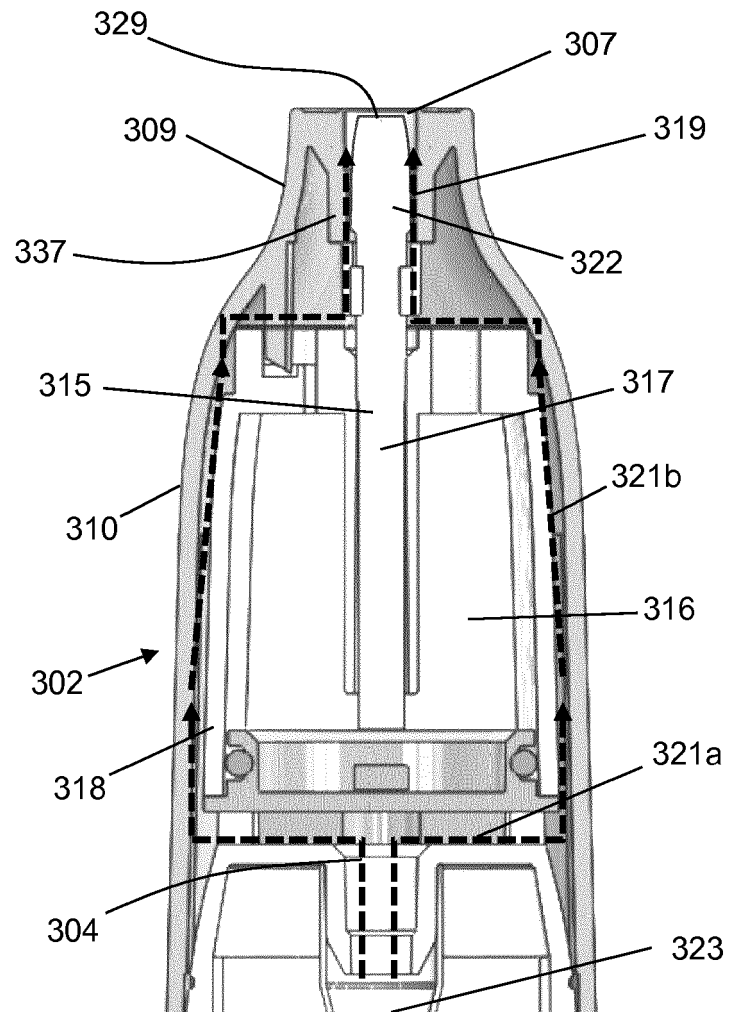
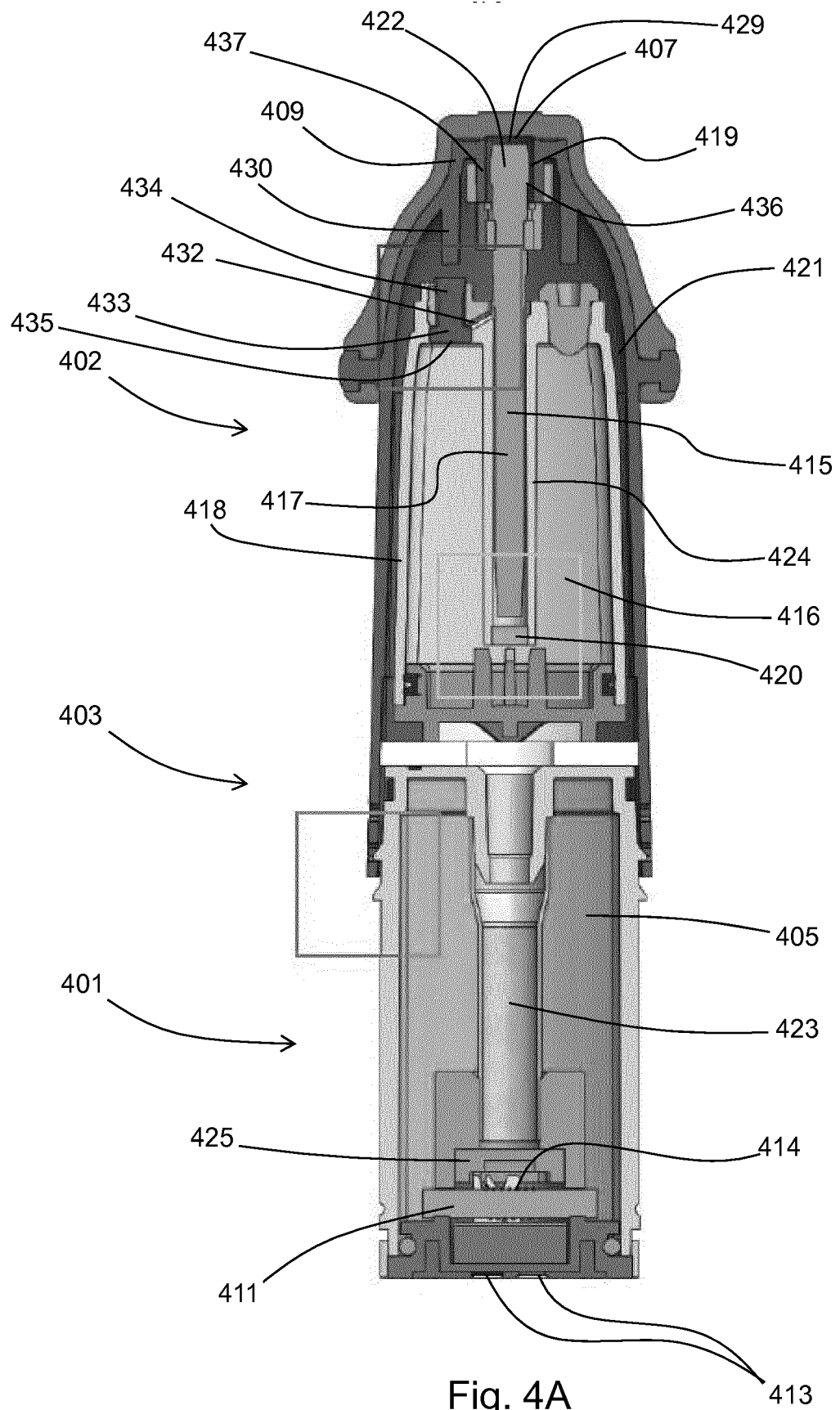


Fig. 3C



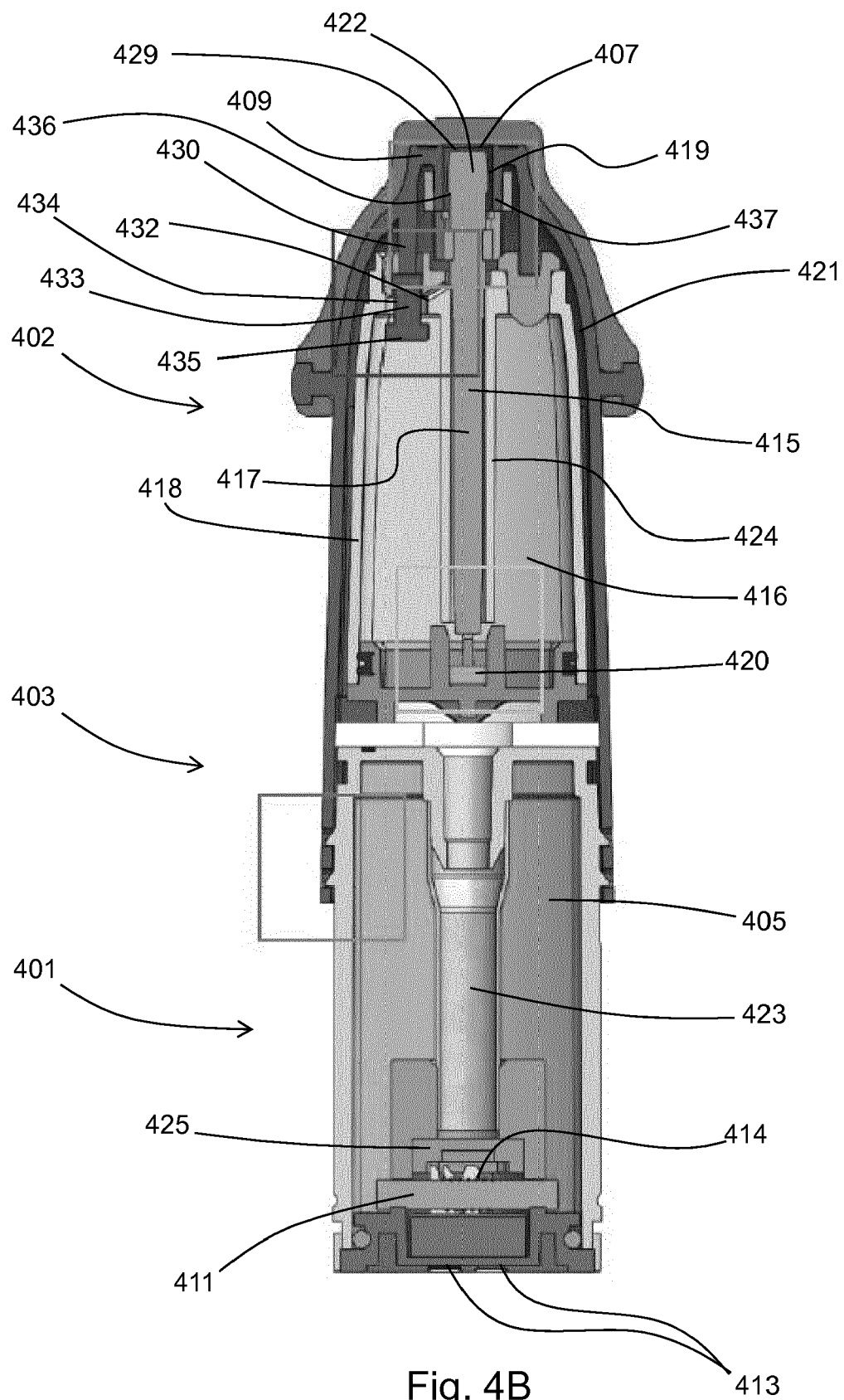
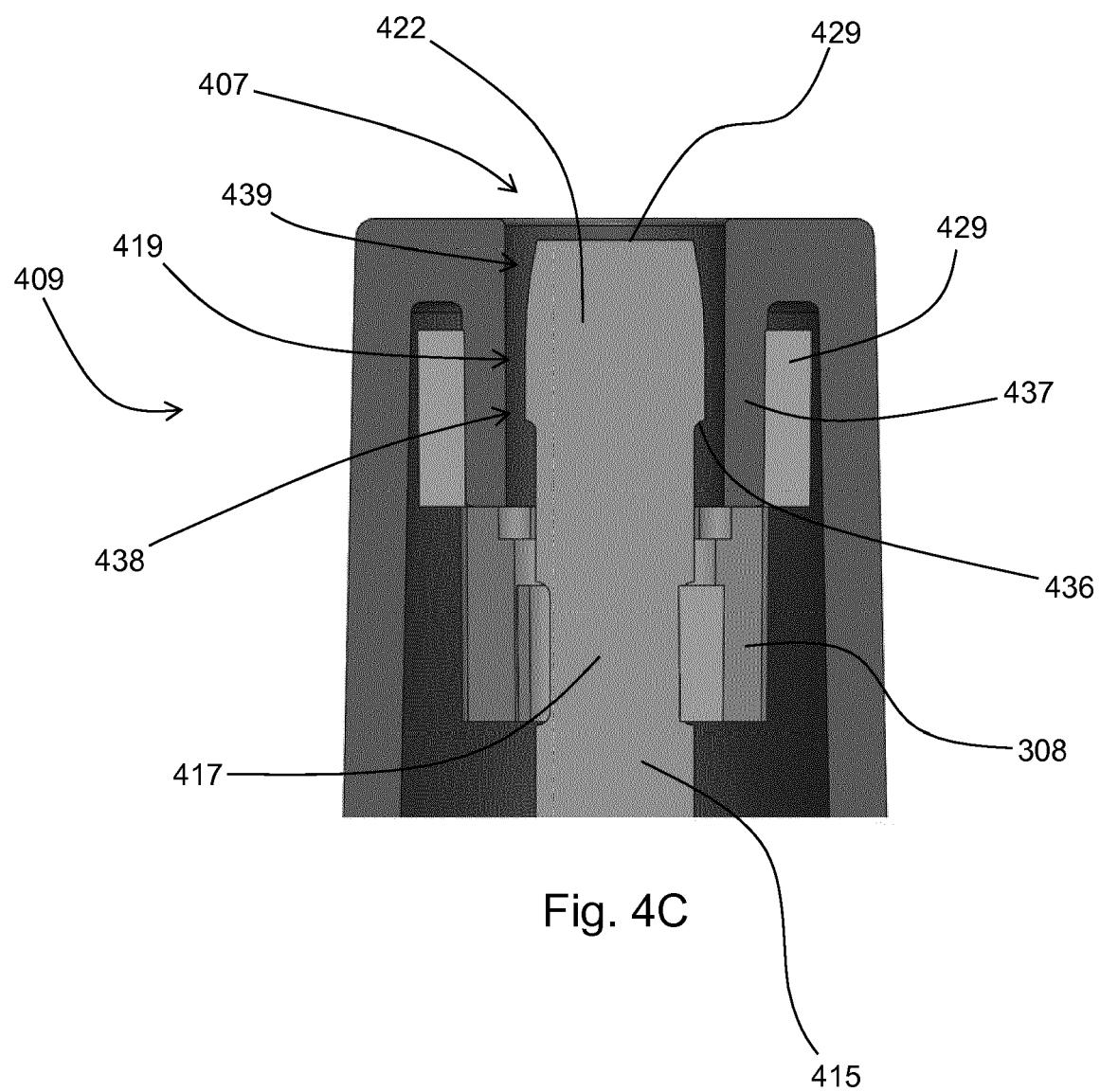


Fig. 4B





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